

ABSTRACT

A piezoelectric element includes two electrode films and a layered piezoelectric film which is sandwiched between the electrode films and made of two thin piezoelectric films each having preferred orientation along the (111) plane. The two thin piezoelectric films are aggregates of columnar grains, respectively, which are continuously linked to each other. The columnar grains of the second thin piezoelectric film have a larger average cross-sectional diameter than the columnar grains of the first thin piezoelectric film. The ratio of the thickness of the layered piezoelectric film to the average cross-sectional diameter of the columnar grains of the second thin piezoelectric film is 20 to 60 inclusive.